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**TENTATIVE WASTE DISCHARGE REQUIREMENTS ORDER FOR E. & J. GALLO
WINERY, FRESNO WINERY, FRESNO COUNTY**

This letter transmits my comments on the subject tentative order for the discharge of waste to land from the winery at 5610 East Olive Avenue in Fresno County owned and operated by E. & J. Gallo Winery (Gallo). In 2010, I retired from the Central Valley Water Board (Regional Board), where I worked as a Senior Water Resources Control Engineer in regulatory work concerning land discharges of municipal and industrial wastes. I am familiar with Gallo's discharges at its Fresno and Livingston Wineries. I reviewed the tentative order and the Regional Board's case file on Waste Discharge Requirements (WDRs) Order 94-103 for Gallo Fresno.

I am also a long-time Fresno resident who, understandably, would prefer the quality of groundwater extracted by the City's municipal wells be protected and preserved from sources of controllable contamination, especially when the source of contamination is subject to regulation by the Regional Board. But, despite being regulated by the Regional Board for many decades, Gallo's land discharge of stillage and winery wastewater has caused underlying groundwater to contain waste constituents of winery origin in concentrations exceeding water quality objectives established to protect the beneficial use of groundwater for municipal supply.

Finding 25 of the tentative order states,

Gallo's discharge has contributed to and/or caused the pollution of the underlying groundwater with nitrate...upgradient of the City of Fresno's drinking water wells...[and that] Gallo is currently working with the Central Valley Water Board Enforcement Unit staff to characterize the lateral and vertical extent of elevated nitrate as nitrogen and salt concentrations in groundwater.

It is clear from findings in the tentative order and in documents in Gallo's Regional Board's case file that Gallo is in violation of two important requirements in WDRs Order 94-103. The first, Standard Provision A.11, is a basic condition of discharge, which stipulates that neither the treatment nor the discharge shall create a condition of pollution as defined in California Water Code (CWC Section 13050). The second is Groundwater Limitation D.3, which stipulates, in part, that the discharge, in combination with other sources, shall not cause groundwater to contain waste constituents in concentrations that adversely affect beneficial uses or exceed maximum contaminant levels (MCLs) specified in California Code of Regulations (CCR), Title 22, Division 4, Chapter 15.

The tentative order includes the same 1 March 1991 version of Standard Provisions as Gallo's current WDRs Order. It also includes groundwater limitations similar to the current WDRs Order:

Release of waste constituents from any treatment unit, delivery system, storage areas, or Land Application Area associated with the Facility shall not cause or contribute to groundwater containing concentrations of constituents identified below; or natural background quality, whichever is greater.

1. Nitrate as nitrogen of 10 mg/L.
2. EC of 900 umhos/cm.
3. For constituents identified in Title 22, the MCLs established therein.

Findings 70 to 73 of the tentative order discuss the quality of groundwater passing below and beyond Gallo's LAA. None of Gallo's monitoring wells at the downgradient edge of Gallo's property, with the exception of MW-5b, has EC levels below 900 umhos/cm. Similarly, none of these wells contains nitrate as nitrogen in concentrations less than 10 mg/L (three wells are between four to six times this limitation). The highest concentrations of waste constituents are found in MW-6, which is downgradient of Blocks 13 and 14 and Gallo's composting facility. Soil monitoring data provided in Gallo's 2012 RWD shows elevated nitrogen concentrations at depths just above the water table.

Because Gallo's long-time waste handling and disposal practices has caused groundwater to be polluted from nitrate and degraded by salts, Gallo will be in immediate noncompliance with the tentative Order's Standard Provision A.11 and Groundwater Limitations (F.1, F2, and possibly F.3).

Finding 74 describes how Gallo's registered civil engineering consultant estimates that it takes a long time (22 to 36 years) for Gallo's applied waste to percolate to the water table, and that it takes a very long time (17 to 165 years) for groundwater to move laterally beneath the site. These estimates differ substantially from those developed by registered geologists who have previously evaluated Gallo's discharge situation. In a 9 November 2001 Regional Board staff memorandum, David Sholes (CEG 1687) discusses his review of a 2000 technical report, *Groundwater Data Review Gallo Fresno Winery*, submitted by Gallo pursuant to a 6 October 2000 Notice of Violation. Mr. Sholes estimates the travel time for groundwater to move laterally across Gallo's LAA as ranging from three to six years (880 to 1760 feet/year).

The 1992 technical report, *Groundwater Quality Investigation, Bakman Water Company, Fresno, California* prepared by Krazan & Associates, Inc. and certified by Bruce Myers (RG 4740), cites work performed by Kenneth Schmidt (RG 1578, HG 176) for Bakman Water District that estimates groundwater flow in the discharge area to be 500 to 700 feet/year. In his 1992 report, Mr. Myers used soil boring data collected by The Twining Laboratories in 1990 from Gallo's LAA to estimate average vertical permeabilities that range from 0.13 to 0.21 feet/day. He states that these estimates are within the range identified by Schmidt in his 1991 technical report, *Hydrogeologic Conditions in the Fresno-Clovis Metropolitan Area* in Fresno/Clovis Metropolitan Water Resources Management Plan, Phase 1 Report, Volume 11, CH2M-Hill, published in January 1992. Mr. Meyers uses these ranges along with other groundwater flow parameters (e.g., effective porosity of 0.25) to estimate the velocity of winery wastewater seepage to range from 0.84 to 0.56 feet/day. He estimates the travel time as follows:

For an average current depth to groundwater of 65 feet, this would suggest it takes approximately 77 to 116 days for wastewater to percolate from the surface of the winery disposal fields to the groundwater below.

One interpretation of why Gallo's civil engineering consultant cites very long travel times for percolating wastewater to reach groundwater and for groundwater to flow downgradient beyond

Gallo's property is that such long travel times would explain why groundwater quality will be very slow to improve following Gallo's implementation of improved discharge practices. By attributing current (and future) pollution to past deficient discharge practices, Gallo will likely claim that evidence of continued pollution reflects legacy issues, not impacts from its current discharge.

Adoption of the tentative order in the absence of an accompanying formal enforcement order to address groundwater pollution and degradation caused by Gallo's discharge is not consistent with State Board's Enforcement Policy. The formal enforcement order should also address other terms and conditions in the tentative order that Gallo will violate upon order adoption:

Discharge Specification C.1. No waste constituent shall be released, discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations of this Order.

Data provided in the RWD show that compost facility soil and downgradient groundwater contain elevated concentrations of waste constituents of winery origin. The top 10 feet of the compost facility soil boring contains very high concentrations of waste constituents (e.g., 510 mg/kg sodium, 9,300 mg/kg potassium, and 880 mg/L sulfate). The elevated sodium, potassium, and sulfate concentrations in upper compost facility soil may be attributable to Gallo's practice of discharging high saline ion exchange regenerant solution to compost windrows for moisture control. While the soil data does show attenuation of waste constituent concentrations with depth under the compost facility, the data is for only one soil boring. Additional soil borings are necessary in this area to evaluate the extent to which waste constituents released to soil from compost operations have caused or threaten to cause violations of groundwater limitations. This work will likely be performed as part of Gallo's effort to comply with the tentative order's Provision G.14, which requires Gallo to demonstrate it satisfies the Title 27 requirements for operations at the composting facility. The tentative order's requirement for Gallo to, in effect, achieve and maintain compliance with Title 27 requirements for its compost facility should be transferred to a formal enforcement order accompanying the tentative order.

Discharge Specification C.2. Wastewater treatment, storage, and disposal shall not cause pollution or a nuisance as defined by Water Code section 13050.

This specification duplicates the requirement of Standard Provision A.11. Gallo will continue to be in violation of this "no pollution" requirement because groundwater flowing beneath its property will continue to contain waste constituents exceeding applicable water quality objectives.

Discharge Specification C.8. Storage of residual solids, including pomace and/or diatomaceous earth on areas not equipped with means to prevent storm water infiltration, or a paved leachate collection system is prohibited.

The RWD indicates that only the feedstock receiving area and seed drying area are paved. The RWD does not describe the construction of the sumps that collect leachate and storm water runoff from the feedstock receiving area and the compost curing area, but does state that commingled leachate and storm water collected in these sumps is discharged to the LAA. A Google Earth view of the compost facility (36°45'42.84" N 119°41'13.92" W) dated 5 April 2014 shows ponds of dark-colored water at three sumps. Soil borings advanced in the compost facility area should include these and other areas subject to periodic inundation. Because Gallo cannot comply with this specification immediately, an

accompanying enforcement order should impose a time schedule for Gallo to implement corrective measures to achieve and maintain compliance with this specification.

Land Application Area Specification D.2. Application of waste constituents to the land application areas shall be reasonable agronomic rates to preclude creation of a nuisance and unreasonable degradation of groundwater, considering the crop, soil, climate, and irrigation management systems. The annual nutritive loading of the land application areas, including the nutritive value of organic and chemical fertilizers and of the wastewater shall not exceed the annual crop demand.

The RWD and tentative order does not address the issue of potassium loading to LAA soils. Potassium is a plant nutrient and, to prevent excessive concentrations of applied potassium to LAA soils that could break through and degrade groundwater (like at O'Neill Vintner's Reedley Winery), application of potassium in the discharged waste should also not exceed "reasonable agronomic rates." The tentative order should identify potassium as a waste constituent that has nutritive value and therefore subject to the agronomic rate requirement of Land Application Area Specification D.2.

If potassium is considered an agronomic waste constituent, it is extremely unlikely that Gallo will be able to comply with the requirement to limit potassium loadings to reasonable agronomic rates. Complete compliance with this specification will require Gallo to substantially reduce the amount of winery wastewater it applies to land. If my understanding of Gallo's discharge situation is correct, one reason why Gallo does not discharge all of its Fresno Winery's processing wastewater to the municipal sewer is because of insufficient capacity in Gallo's sewer pipeline connection to the municipal sewer. If Gallo truly wants to reduce its environmental impact at its Fresno Winery, it should install a larger connection line to sewer and, if necessary, implement pretreatment for crush/press wastewater, and discharge all of its wastewater to the municipal sewer. In any event, because Gallo is unable to comply with this specification with respect to potassium, an accompanying enforcement order should impose a time schedule for Gallo to implement corrective measures to achieve and maintain compliance with this specification.

Land Application Area Specification D.5. The Discharger shall ensure that water, BOD, and nitrogen are applied and distributed uniformly across each land application area field. The Discharger shall implement changes to the irrigation system and/or operational practices as needed to ensure compliance with this requirement.

The RWD indicates that wastewater will be applied to vineyard blocks by border irrigation. It provides hydraulic loading and nitrogen loading scenarios for the various LAA blocks and projects that blocks planted in vineyard with cover crop will receive annual wastewater discharges of one inch. Gallo will be unable to comply with this specification for uniform wastewater applications to vineyard blocks without controlled dilution of wastewater with supplemental irrigation water prior to application and/or using sprinklers for wastewater applications. Accordingly, Gallo will be in violation of this specification upon order adoption. An accompanying enforcement order should include a time schedule to achieve and maintain compliance with this specification.

Land Application Area Specification D.9. The volume of wastewater applied to the land application areas on any single day shall not exceed reasonable agronomic rates based on the vegetation grown, pre-discharge soil moisture conditions, and weather conditions.

It appears that the RWD indicates that Gallo will conduct its future discharge largely in the same manner as it has in the past. That is, wastewater will be discharged to long, narrow checks that are planted with crops following the discharge season to remove residual nitrogen. This specification implies Gallo must restrict its wastewater applications to times when crops are actually growing in the LAA blocks. Because it appears that Gallo does not intend to restrict its wastewater applications accordingly, then it will violate this specification. The accompanying enforcement order should contain a time schedule for Gallo to achieve and maintain compliance with this specification.

Solids Specifications E.1. Any handling and storage of residual solids shall be temporary, and controlled and contained in a manner that minimizes leachate formation and preclude infiltration of waste constituents into soils in a mass or concentration that will violate Groundwater Limitations of this Order.

Data in the RWD indicates that discharges of waste to land by Gallo's compost facility has caused the upper 10 inches of soil to contain very high concentrations of waste constituents that, absent attenuation in the vadose zone, threatens to unreasonably degrade groundwater and contribute to an existing condition of pollution. Also, Gallo's compost facility constantly stores large quantities of finished compost. This practice of long-term storage of composted residual solids is not compliant with this specification. Therefore, Gallo threatens to violate this specification. The accompanying enforcement order should contain a time schedule for Gallo to achieve and maintain compliance with this specification.

The above discussion only addresses several requirements of the tentative order that Gallo will violate (or threaten to violate) upon order adoption. Another matter to be addressed is the groundwater impacts caused by Gallo's decades-long discharge. A 5 October 2010 staff letter cites Gallo for polluting groundwater from nitrate and degrading it from salinity in violation of WDRs Order 94-103. The letter requests a Phase 1 Investigation Work Plan, in accordance with State Water Board Resolution 92-49, to expand upon Gallo's voluntary efforts "to delineate the vertical and lateral extent of the salinity plume in groundwater caused by its discharge of spent ion exchange regenerant to Block 18." A 1 August 2011 staff letter determines Gallo's Phase 1 Investigation Work Plan, prepared by KJC, incomplete, as it "does not propose an assessment of the vertical, as well as horizontal, impacts to groundwater." Lastly, a 7 January 2013 staff letter comments on Gallo's Monitoring Well Installation Report prepared by KJC on two monitoring wells of differing depths near downgradient Monitoring Well #5 (MW-5). The report proposes quarterly monitoring of groundwater from the new wells for two years before evaluating the need for additional data to delineate the vertical extent of constituents in groundwater associated with Gallo's discharge. Staff rejects this proposal:

Central Valley Water Board staff has no objections to your proposed monitoring of the newly installed wells. However, the proposed effort is an insufficient response to staff's 5 October 2010 request that Gallo "Determine the nature and vertical and horizontal extent of groundwater impacts caused by Gallo's discharge" as has been reiterated to Gallo in subsequent meetings, most recently 28 November 2012. The plume of groundwater affected by the Winery's discharges is at least a mile and a half wide and of unknown depth or length, **and the rate of plume definition has been unacceptably slow**. As agreed to at our meeting of 28 November 2012, Gallo will be developing a plan to aggressively characterize the extent of groundwater affected by its discharges for discussion during our next meeting on 6 February 2013. The schedule is to include milestones for each calendar quarter. (Emphasis added)

There is nothing in Gallo's Regional Board's case file that indicates Gallo has developed a plan "to aggressively characterize the extent of groundwater affected by its discharge." Gallo's delay in delineating the nature and vertical and horizontal extent of groundwater impacts caused by its discharge is unacceptable, especially since the nitrate plume in groundwater emanating from beneath Gallo's property threatens the use of expensive municipal drinking water wells. Gallo's consultants will, no doubt, argue that other sources of nitrate pollution are also responsible for this nitrate plume in an attempt to diffuse Gallo's culpability. While rural households reliant on septic tanks and agricultural practices contribute nitrogen to regional groundwater, these "non-point" nitrogen sources are far less than the massive nitrogen loadings to land that typified Gallo's past discharges. It is clear from the apparent frustration in staff's 7 January 2013 letter that Gallo is dragging its feet in evaluating its discharge's impact to groundwater. Even though two years have passed since the January 2013 letter, there appears to be little or no movement by Gallo to investigate the impacts to groundwater caused by its discharge. Gallo's endless delays in initiating an evaluation of its discharge's impact to groundwater should be ample justification for the Regional Board's Executive Officer to issue Gallo a cleanup and abatement order pursuant to CWC Section 13304.

Other Comments.

The RWD describes a discharge of up to 54.2 MGY of treated stillage and general process winery wastewater from Gallo's Fresno Anaerobic Treatment System (FATS) and untreated Crush/Press wastewater to a 433-acre Land Application Area (LAA), 285 acres of vineyard with cover crops, and 148 acres double cropped with Sudan grass and winter forage. The RWD states that the 54.2 MGY annual flow limit reflects the maximum loading of FDS in the discharge to LAA soils. It indicates that, following treatment, the discharge's loadings of nitrogen and BOD are substantially reduced from historic levels. The RWD concludes that lower loadings will not exceed the proposed crops' nitrogen demand and the soil's ability to decompose BOD. Given the extent of nitrate pollution in groundwater beneath Gallo's LAA and Gallo's likely continued practice of discharging wastewater to fallow land between crop plantings, it is appropriate for the Regional Board to require Gallo to monitor nitrogen constituents in soil-pore liquid at root zone depth.

Recommendation 1: Expand vadose zone monitoring program to include all double-cropped LAA blocks, and require soil pore liquid monitoring in these blocks for, at a minimum, EC, nitrate as nitrogen, TKN, ammonia, and total organic carbon (which requires a smaller sample size than BOD).

The RWD provides an analysis of the discharge's consistency with the Basin Plan and Antidegradation Policy. The analysis relies on the use of models developed by KJD to run simulations of various discharge flow and quality scenarios and varying vadose zone and groundwater parameters to project the Total Dissolved Solids (TDS) concentration in groundwater downgradient of Gallo's discharge. With a derived upgradient groundwater TDS concentration of 463 mg/L and Gallo's exclusive use of low salinity surface water supplied by the Fresno Irrigation District, the RWD projects that the TDS in groundwater downgradient of Gallo's discharge will range from 458 to 462 mg/L. The analysis uses this result, along with other information, to argue that Gallo's discharge, as characterized in the RWD, will not degrade groundwater and is consistent with the Antidegradation Policy.

However, the models used by Gallo's consultant appear to omit from consideration the consequence of percolating wastewater coming into contact with salts in the vadose zone. Given the magnitude of accumulated salts in LAA soils, it is likely that the salinity of percolating wastewater will exceed that

derived by the model. The RWD states that the model used has been subject to a conceptual peer review by Ron Crites of Brown and Caldwell. Mr. Crites has provided consulting services to Gallo for several decades. Because of this past involvement with Gallo's discharge, the RWD's model would be more convincing if its peer review was by someone who, as the saying goes, doesn't have a dog in the fight.

Finding 3 refers to Attachment B, which lists the Assessor's Parcel Numbers of parcels within Gallo's LAA. In order to correlate which parcels are associated with which LAA block, it would be helpful if Attachment B included information to identify the LAA block or blocks associated with each parcel. It would also be helpful if the tentative order included a map showing the locations of these parcels. It appears that one of these, 310-07-049S (Block 6), includes four contiguous rectangular-shaped ponds immediately north of the San Joaquin Valley Concentrate facility (see Google Earth, 36°45'36.42" N 119°41'55.36" W). Neither the RWD nor the tentative order mentions these ponds.

Recommendation 2. Revise the tentative order to include information identifying the LAA block(s) in each parcel and to provide information regarding the four ponds near the southwest corner of LAA Block 6B. If staff determines that wastewater (or potentially contaminated storm water runoff) is discharged to these ponds, then the pond discharge should be subject to the terms and conditions of the tentative order.

Finding 9 states that the Gallo Fresno Winery "is a wine making grape juice concentrate facility." While factually correct, a more accurate statement would be that Gallo's Fresno Winery is one of the world's largest wineries, if not the largest (as measured by crush volume). Similarly, Gallo is the one of the world's largest family-owned winery business, if not the largest.

Finding 29 indicates Gallo has access to high-quality surface water provided by the Fresno Irrigation District. Given the current drought, FID has curtailed surface water deliveries in its service area. What kind of water rights does Gallo hold for this surface water?

Finding 30 describes the BOD loading of Gallo's discharge as ranging up to 242 lbs/ac/day on a proposed seven-day-cycle average. The Administrative Draft of the tentative order set the BOD limit to 100 lbs/ac/day to prevent nuisance. The tentative order circulated for public comment increases the BOD loading to 250 lbs/ac/day. Findings 36 and 37 briefly discuss the results of field tests sponsored by the Wine Institute conducted by KJC at the Fresno Winery in 2002 and 2003. While the test results show substantial removal of BOD in surface soils, they also show significant concentrations of BOD in soil pore liquid at root zone depth. The tentative order requires Gallo to monitor soil pore liquid in all LAA blocks receiving BOD loadings greater than 150 lbs/ac/day. Finding 35 states, "There are few studies that have attempted to determine maximum BOD loading rates for protection of groundwater quality." It is appropriate for the Regional Board to require Gallo to monitor the soil pore liquid in all double-cropped LAA blocks to ensure applied BOD attenuates within the root zone.

Finding 40 concerns the Fresno Winery's production wells. The RWD includes a figure showing the locations of many supply wells, but only provides data on a few. Has Gallo abandoned production wells located within the Winery Facility (i.e., PW-1 through PW-4)?

Recommendation 3. The MRP Source Water Monitoring should include all production wells, not just those currently used, to provide water quality data useful in delineating the nature and the vertical and horizontal extent of groundwater impacts caused by Gallo's discharge.


Finding 41 indicates that groundwater pumped from one of Gallo's irrigation wells (IW-1) contains nitrate as nitrogen in concentrations exceeding the water quality objective, as well as elevated salts compared to groundwater pumped from Gallo's other two irrigation wells that straddle Mill Ditch. Depending on its construction, IW-1 may be serving as a conduit for waste constituents in the upper groundwater to degrade deeper groundwater.

Recommendation 4. Include a provision in the tentative order that requires Gallo to investigate the potential for IW-1 to degrade deeper groundwater with waste constituents of winery origin. If the well is found to be contributing to degradation of deeper groundwater, then the provision should require the well to be destroyed in accordance with applicable State and local regulations.

SUMMARY

While a step in the right direction, the tentative order should be accompanied by a cease and desist order to address discharge specifications and groundwater limitations that Gallo has violated in the past and will continue to violate. The cease and desist order should impose time schedules for Gallo to implement corrective measures to achieve and maintain compliance with the updated WDRs. Also, the Regional Board's Executive Officer should issue Gallo a cleanup and abatement order to require Gallo to delineate the nature and vertical and horizontal extent of groundwater impacts caused by its discharge and to investigate and implement appropriate cleanup measures.

I appreciate the opportunity to submit these comments.



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